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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/678,741

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Hassan Mostafavi

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12/08/2010

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EXAMINER

RAMIREZ, JOHN FERNANDO

ART UNIT

PAPER NUMBER

3777

MAIL DATE

DELIVERY MODE

12/08/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/678,741 | Applicant(s) MOSTAFAVI, HASSAN | |
| | Examiner JOHN F. RAMIREZ | Art Unit 3777 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 October 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32,50-56,61-63,66 67,75 and 81-112 is/are pending in the application.
- 4a) Of the above claim(s) 1-32,50-55,75,82-92,98-102 and 109-112 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 94-97 and 105-108 is/are allowed.
- 6) ☒ Claim(s) 56,61-63,66,67,81,93,103-104 and 113-114 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>08/20/10;10/21/10</u> . | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

Applicant's arguments filed on 10/06/10 have been fully considered but they are not persuasive.

Applicant alleges on page 21 of the amendment that Kaufman reference provide no disclosure or teachings for calculating an image phase value, and assigning the image phase value for the image data using a processor to thereby bin the image data.

However, the examiner of record respectfully disagrees with applicant's comments. In column 16, lines 38-67, the specifications of the Kaufman patent specifically states:

From the Fourier transformation, the software can determine the fundamental frequency of the heart and generate
40 images of the heart in different phases of the heart cycle. As will be described below, the user can display a plurality of projection images of the heart, in which each of the images corresponds to a different phase of the heart cycle.

Because it is difficult to extract the phase information
45 present in the Fourier spectrum, the Fourier transformation does not inform the user as to which slices represent the diastolic phase, systolic phase, and the like. Moreover, such a transformation does not account for irregular heartbeats or a changing of the heartbeat over the image acquisition
50 period. In order to determine which slices correspond to the diastole, the software of the present invention can analyze the slice images to find the biggest heart volume image (e.g., the diastole) in which the heart motion is the least.

To determine the phase of each of the slices, (e.g., to
55 determine which slices correspond to diastole), a local intensity signal of the slice images can be run through a derivative filter to produce a graph such as FIG. 13. Generally, this method can be used in conjunction with the results from Fourier analysis, as described above, to find the
60 size of the heart in each of the slice images. With the frequency derived from Fourier analysis and phase from the local maxima, slice selection can be extended beyond the ROI of Step 206. It should be appreciated however, that it may be possible to use the local intensity profile as an
65 independent algorithm. In such embodiments, the user would need to cover all slices with the selected region of Step 206.

Based on the above evidence, the system and method disclosed by Kaufman teaches or suggest calculating an image phase value, and assigning the image phase value for the image data using a processor to thereby bin the image data.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 3777

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 56, 61-63, 66-67, 81, 93, 103-104 and 113-114 are rejected under 35 U.S.C. 102(e) as being anticipated by Kaufman et al. (US 7,006,862).

Kaufman discloses a system and associated method in which radiation therapy is gated by an ECG signal, that involves at least first and second real-time images and forming a composite image with thresholding pixel (contrast) values in the activation /deactivation of a therapeutic radiation (abstract; Fig. 16; col. 20, lines 16-23; col. 3, lines 32-45; col. 8, lines 8-14; col. 13, lines 24-33; col. 2, lines 57-64; col. 9, lines 10-17). Additionally, the method of Kaufman et al. is specific to synchronizing with respect to phases of the cardiac cycle, which implies a template to align the characteristic phases (col. 8, lines 8-12; also col. 10, lines 57-61 for slice alignment with the R-R cycle). Template matching is additionally inferred from the monitoring of duration of the R-R cycle in Kaufman et al. (col. 11, lines 33-43), and wherein the image data corresponds with a phase value of a breathing cycle, and the image phase value is calculated using the phase value of the breathing cycle (col. 16, lines 38-43 and col. 16 lines 54-67), and obtaining a breathing signal having a value and using the value in a mathematical process to determine the image phase value (col. 16, lines 38-67 and col. 17 lines 1-29).

Allowable Subject Matter

Claims 94-97 and 105-108 are allowable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN F. RAMIREZ whose telephone number is (571)272-8685. The examiner can normally be reached on (Mon-Fri) 7:00 - 3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chen Robert can be reached on (571) 272-3672. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. F. R./
Examiner, Art Unit 3777

Application/Control Number: 10/678,741

Page 6

Art Unit: 3777

/Tse Chen/

Supervisory Patent Examiner, Art Unit 3777